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McGuire Woods  
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EXAMINER

KRISHNAN, SUMATI

ART UNIT PAPER NUMBER

2875

DATE MAILED: 09/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicati n No.

10/087,741

Applicant(s)

AHN ET AL.

Examiner

Sumati Krishnan

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-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

## Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: page 6, line 17 states “cathode electrode 12” which should be “cathode electrode 6”.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, and 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al (US 6436221).

Regarding claim 1, Chang discloses a method for fabricating a field emission display comprising the steps of forming a cathode electrode (conductive pattern coated on substrate, see abstract), forming an emitter having a carbon based material (CNT, see abstract) on the cathode electrode, and depositing an emitter surface treatment agent on the substrate to cover the emitter (adhesive film, see abstract), hardening the emitter surface treatment agent (sintering, column 3 line 63), and removing the hardened emitter surface treatment agent from the substrate such that

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the carbon based material contained in the emitter can be exposed, see columns 3-4 lines 49-67, and 1-5.

Regarding claims 2 and 3, Chang discloses forming the emitter on the cathode by printing a paste through a mesh patterned screen, see abstract.

Regarding claim 4, the carbon based material is a carbon nanotube, CNT.

Regarding claim 6, the emitter surface treatment agent is hardened by a heat treatment process, specifically sintering, see column 3 line 63. Since Chang discloses that the adhesive film is deposited after the soft bake process and only afterward is the sintering of the device as a whole performed, the adhesive film is therefore hardened through this process of sintering at the same time as the CNT is cured.

Regarding claim 7, the emitter surface treatment is a polyimide, see column 3 line 56-57 which specifies that the adhesive film (surface treatment) is a polymer film.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al (US 6436221) in view of Asai et al (US 6534723).

Chang discloses the method of claim 1, but does not specifically disclose spin coating as the method for deposition of the emitter surface treatment agent. However, Chang does disclose that the surface treatment agent can be deposited via a variety of methods including the method of laminating the layer on the cathode electrode. Asai discloses the deposition of an adhesive layer of a semiconductor device deposited by either spin coating or by lamination, thereby disclosing that these two methods are art recognized equivalents. See Asai column 17 lines 60-65. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used spin coating in the deposition of Chang's adhesive film as it is an art recognized equivalent method to lamination.

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al (US 6436221).

Chang discloses the method of claim 2, wherein the printed paste (CNT) is heat treated at the temperature of about 350-430 degrees C, (see abstract, Chang's CNT is sintered at a temperature of about 35-550 degrees C). Chang however does not explicitly disclose the duration of the sintering process. However, it is well known in the art to heat treat the carbon nanotubes for a few minutes at such a temperature in order to successfully perform curing. Therefore, it would have been obvious to one of ordinary skill in the art to have heat treated

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Chang's CNT for about 2 minutes, as is claimed, in order to solidify the CNT on the cathode electrode.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al (US 6436221) in view of Murata et al (US 6013238).

Chang discloses the method of claim 6 wherein the heat treatment of the surface treatment agent is done by sintering, see column 3 line 64 for example. Chang does not specifically disclose what method is used to perform the sintering. However, Murata's disclosure at column 13 lines 65-67 makes it clear that the hot plate method is a well known, conventional method used for sintering. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a hot plate, as disclosed by Murata, as the means of sintering, as disclosed by Chang. Additionally, absent any showing of a particular advantage of using a hot plate at 90 degrees C for 20 minutes instead of a sintering process at a higher temperature for a lesser amount of time, it is argued that it would have been obvious to use either method as the heat treatment method of the surface treatment agent, since both produce the same result -- curing of the film.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sumati Krishnan whose telephone number is 703-305-7906. The examiner can normally be reached on 8:00 am - 4:30 pm..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on 703-305-4939. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

SK

  
THOMAS SEMBER  
PRIMARY EXAMINER